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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/698,703	HART ET AL.	
	Examiner	Art Unit	
	SALMAN AHMED	2619	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 5/23/2008.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-66 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) 3-5,10-27,33,34,36-39,42,53,57 and 58 is/are allowed.

6)☒ Claim(s) 1,2,6,7, 9,28-32,35,40,41,43-52,54-56 and 59-66 is/are rejected.

7)☒ Claim(s) 8 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 31 October 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claims 1-66 are pending.

Claims 1, 2, 6, 7, 9, 28-32, 35, 40-41, 43-52, 54-56 and 59-66 are rejected.

Claims 8 is objected to.

Claims 3-5, 10-27, 33, 34, 36-39, 42, 53, 57 and 58 are allowed.

Claim Objections

1. Claims 57 and 58 are objected to for not properly marking the amendments made to the claims. Claim 57 original limitations are mistakenly underlined as new added limitations. Claim 58 does not show the limitation that has been taken out as stroked out texts.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 2, 6, 28, 29, 30-32, 35, 40, 41, 43-45, 47, 51, 60-65 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maltsev as applied to claims 1, 28, 44 and 60 above and further in view of Poulbere et al. (US PAT 6785350, hereinafter Poulbere).

In regards to claims 1 and 44, Maltsev teaches *a method/means comprising: method/means for wirelessly receiving a signal* (paragraph 0015, The present invention pertains to wireless communications, and in one embodiment, the present invention pertains to detection and synchronization with a symbol boundary of an orthogonal frequency division multiplexed (OFDM) symbol); *method/means for detecting a start of packet (SOP) from the received signal* (paragraph 0018, WCDs detect OFDM packets and synchronize to OFDM symbol boundaries (i.e. SOP)) *using at least one SOP detection criterion for a packet that conforms to a wireless networking standard* (section 0018, OFDM packets may be preceded by a sequence of training symbols, which may be used for packet detection and synchronization. The sequence may include a plurality of short training symbols followed by a plurality of long training symbols. In one embodiment, the sequence of training symbols may be in accordance with an IEEE 802.11a standard and may have as set of known characteristics. In another embodiment, the sequence of training symbols may be in accordance with a HiperLAN standard and may have other sets of known characteristics); *method/means for*

determining a plurality of metrics (coarse timing signal, fine timing signal) *from the received signal, and in the case an SOP is detected, using at least two of the plurality of metrics to determine an initial timing for a received packet* (paragraph 0023, In response to initial packet detection, short training symbol processing element 232 may also utilize at least some of the short training symbols to generate coarse timing signal 236 at time (t.sub.cs) which may indicate an end of the short training symbols and beginning of the long training symbols and data symbols. Synchronization unit 204 may also include long training symbol processing element 234 which may utilize at least some of the long training symbols received from RF receive unit 202 to perform a fine timing synchronization operation to generate fine timing signal 238 at time (t.sub.fs) in response to coarse timing signal 236).

In regards to claims 1 and 44, Maltsev does not explicitly teach determining a measure of the average power rise of the received signal.

Poulbere in the same field of endeavor teaches determining a measure of the average power rise of the received signal (column 6 lines 30-33, calculations of the average power level R(k) (i.e. average power rise) and the calculated correlation value, P(k), are generated on the lines 44 and 46 respectively).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate in Maltsev's system/method the steps of determining a measure of the average power rise of the received signal as suggested by Poulbere. The motivation is that, such method (as suggested by Poulbere, column 3 lines 33-40) advantageously provides apparatus, and an associated method, by which to detect, at a

receiving station, reception of a selected symbol sequence, such as a preamble portion of a frame of data. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claim 64, Maltsev teaches *a method/means comprising: method/means for wirelessly receiving a signal* (paragraph 0015, The present invention pertains to wireless communications, and in one embodiment, the present invention pertains to detection and synchronization with a symbol boundary of an orthogonal frequency division multiplexed (OFDM) symbol); *method/means for detecting a start of packet (SOP) from the received signal* (paragraph 0018, WCDs detect OFDM packets and synchronize to OFDM symbol boundaries (i.e. SOP)) *using at least one SOP detection criterion for a packet that conforms to a wireless networking standard* (section 0018, OFDM packets may be preceded by a sequence of training symbols, which may be used for packet detection and synchronization. The sequence may include a plurality of short training symbols followed by a plurality of long training symbols. In one embodiment, the sequence of training symbols may be in accordance with an IEEE 802.11a standard and may have as set of known characteristics. In another embodiment, the sequence of training symbols may be in accordance with a HiperLAN standard and may have other sets of known characteristics); *method/means for determining a plurality of metrics* (coarse timing signal, fine timing signal) *from the received signal, and in the case an SOP is detected, using at least two of the plurality of*

metrics to determine an initial timing for a received packet (paragraph 0023, In response to initial packet detection, short training symbol processing element 232 may also utilize at least some of the short training symbols to generate coarse timing signal 236 at time (t.sub.cs) which may indicate an end of the short training symbols and beginning of the long training symbols and data symbols. Synchronization unit 204 may also include long training symbol processing element 234 which may utilize at least some of the long training symbols received from RF receive unit 202 to perform a fine timing synchronization operation to generate fine timing signal 238 at time (t.sub.fs) in response to coarse timing signal 236).

In regards to claim 64, Maltsev does not explicitly teach determining a measure of the rise of the received signal power.

Poulbere in the same field of endeavor teaches determining a measure of the rise of the received signal power (columns 5-6 lines 65-15, the controller 32 is coupled, here represented by the line 34, to receive indications of symbol sequences, i.e., the receive signal, received by the receive circuitry 22. Such sequences are provided to a power level calculator 36 and to a correlation calculator 38. The power level calculator 36 is operable to compute a signal power, R(k) (i.e. received power signal) over L signal samples according to a equation).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate in Maltsev's system/method the steps of determining a measure of the rise of the received signal power as suggested by Poulbere. The motivation is that, such method (as suggested by Poulbere, column 3 lines 33-40)

advantageously provides apparatus, and an associated method, by which to detect, at a receiving station, reception of a selected symbol sequence, such as a preamble portion of a frame of data. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claims 28 and 60, Maltsev teaches *an apparatus/means* (FIG. 2 is a highly simplified functional block diagram of an OFDM Receiver) *comprising: a radio receiver/means* (Figure 2, RF receive unit 202) *to receive a signal and output a received signal* (paragraph 0015, The present invention pertains to wireless communications, and in one embodiment, the present invention pertains to detection and synchronization with a symbol boundary of an orthogonal frequency division multiplexed (OFDM) symbol); *a start of packet (SOP) detector/means* (Figure 2, Synchronization unit 204) *coupled to the radio receiver to detect an SOP from a received signal* (paragraph 0018, WCDs detect OFDM packets and synchronize to OFDM symbol boundaries (i.e. SOP)) *using at least one SOP detection criterion for a packet that conforms to a wireless networking standard* (section 0018, OFDM packets may be preceded by a sequence of training symbols, which may be used for packet detection and synchronization. The sequence may include a plurality of short training symbols followed by a plurality of long training symbols. In one embodiment, the sequence of training symbols may be in accordance with an IEEE 802.11a standard and may have as set of known characteristics. In another embodiment, the sequence of training symbols may be in

accordance with a HiperLAN standard and may have other sets of known characteristics); *a processing circuit/means* (Figure 2, short training symbol processing element 232 and long training symbol processing element 234 in combination) *coupled to the radio receiver to determine a plurality of metrics (*coarse timing signal, fine timing signal) *from the received signal; and an initial time determining circuit/means* (Figure 2, synchronization unit 204) *coupled to the SOP detector and the processing circuit, the initial time determining circuit using at least two of the plurality of metrics to determine an initial timing for a received packet in the case an SOP is detected* (paragraph 0023, In response to initial packet detection, short training symbol processing element 232 may also utilize at least some of the short training symbols to generate coarse timing signal 236 at time (t.sub.cs) which may indicate an end of the short training symbols and beginning of the long training symbols and data symbols. Synchronization unit 204 may also include long training symbol processing element 234 which may utilize at least some of the long training symbols received from RF receive unit 202 to perform a fine timing synchronization operation to generate fine timing signal 238 at time (t.sub.fs) in response to coarse timing signal 236).

In regards to claims 28 and 60, Maltsev does not explicitly teach determining a measure of the average power rise of the received signal.

Poulbere in the same field of endeavor teaches determining a measure of the average power rise of the received signal (column 6 lines 30-33, calculations of the average power level R(k) (i.e. average power rise) and the calculated correlation value, P(k), are generated on the lines 44 and 46 respectively).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate in Maltsev's system/method the steps of determining a measure of the average power rise of the received signal as suggested by Poulbere. The motivation is that, such method (as suggested by Poulbere, column 3 lines 33-40) advantageously provides apparatus, and an associated method, by which to detect, at a receiving station, reception of a selected symbol sequence, such as a preamble portion of a frame of data. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claim 40, Maltsev teaches *a method/means comprising: method/means for wirelessly receiving a signal* (paragraph 0015, The present invention pertains to wireless communications, and in one embodiment, the present invention pertains to detection and synchronization with a symbol boundary of an orthogonal frequency division multiplexed (OFDM) symbol); *method/means for detecting a start of packet (SOP) from the received signal* (paragraph 0018, WCDs detect OFDM packets and synchronize to OFDM symbol boundaries (i.e. SOP)) *using at least one SOP detection criterion for a packet that conforms to a wireless networking standard* (section 0018, OFDM packets may be preceded by a sequence of training symbols, which may be used for packet detection and synchronization. The sequence may include a plurality of short training symbols followed by a plurality of long training symbols. In one embodiment, the sequence of training symbols may be in accordance with an IEEE

802.11a standard and may have as set of known characteristics. In another embodiment, the sequence of training symbols may be in accordance with a HiperLAN standard and may have other sets of known characteristics); *method/means for determining a plurality of metrics* (coarse timing signal, fine timing signal) *from the received signal, and in the case an SOP is detected, using at least two of the plurality of metrics to determine an initial timing for a received packet* (paragraph 0023, In response to initial packet detection, short training symbol processing element 232 may also utilize at least some of the short training symbols to generate coarse timing signal 236 at time (t.sub.cs) which may indicate an end of the short training symbols and beginning of the long training symbols and data symbols. Synchronization unit 204 may also include long training symbol processing element 234 which may utilize at least some of the long training symbols received from RF receive unit 202 to perform a fine timing synchronization operation to generate fine timing signal 238 at time (t.sub.fs) in response to coarse timing signal 236).

In regards to claim 40, Maltsev does not explicitly teach determining a measure of the rise of the received signal power.

Poulbere in the same field of endeavor teaches determining a measure of the rise of the received signal power (columns 5-6 lines 65-15, the controller 32 is coupled, here represented by the line 34, to receive indications of symbol sequences, i.e., the receive signal, received by the receive circuitry 22. Such sequences are provided to a power level calculator 36 and to a correlation calculator 38. The power level calculator

36 is operable to compute a signal power, R(k) (i.e. received power signal) over L signal samples according to a equation).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate in Maltsev's system/method the steps of determining a measure of the rise of the received signal power as suggested by Poulbere. The motivation is that, such method (as suggested by Poulbere, column 3 lines 33-40) advantageously provides apparatus, and an associated method, by which to detect, at a receiving station, reception of a selected symbol sequence, such as a preamble portion of a frame of data. Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces/market place incentives if the variations are predictable to one of ordinary skill in the art.

In regards to claims 2, 45 and 62 Maltsev teaches detecting standard SOP preamble as described in the rejections of claims 1, 28, 44 and 60 above.

Maltsev does not explicitly teach detecting the SOP includes using at least one of the set of SOP methods that comprises: detecting that a threshold was exceeded by the average received signal power; detecting that a threshold was exceeded by the average power rise of the received signal; and detecting that a threshold was exceeded by a measure of the quality of the correlation of the input signal with a known part of the preamble.

Poulbere in the same field of endeavor teaches the SOP includes using at least one of the set of SOP methods that comprises: detecting that a threshold was exceeded

by the average received signal power (column 9 claim 7, symbol set detector detects the selected symbol set to have been received at the communication device when both the indications of the phase values are greater than the selected phase-value threshold and the ratios of the values of the correlation calculations relative to values of the average power levels are greater than a selected ratio-value threshold).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maltsev's symbol detecting method with the method of detecting that a threshold was exceeded by the average received signal power as suggested by Poulbere. The motivation is that, such method (as suggested by Poulbere, column 4 lines 60-64) advantageously provides apparatus, and an associated method, by which to detect, at a receiving station, reception of a selected symbol sequence, such as a preamble portion of a frame of data.

In regards to claim 6 Maltsev does not explicitly teach determining a logical function of at least one of the set of logical indicators including: that a threshold was exceeded by the average received signal power; that a threshold was exceeded by the average power rise of the received signal; that a threshold was exceeded by a measure of the quality of the correlation of the input signal with a known part of the preamble; and that a threshold was exceeded by a weighted sum of the measure of the average received signal power and the measure of the correlation of the input signal with the known part of the preamble.

Poulbere in the same field of endeavor teaches determining a logical function of at least one of the set of logical indicators including: that a threshold was exceeded by

the average received signal power (column 9 claim 7, symbol set detector detects the selected symbol set to have been received at the communication device when both the indications of the phase values are greater than the selected phase-value threshold and the ratios of the values of the correlation calculations relative to values of the average power levels are greater than a selected ratio-value threshold).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maltsev's symbol detecting method with the method of determining a logical function of at least one of the set of logical indicators including: that a threshold was exceeded by the average received signal power as suggested by Poulbere. The motivation is that, such method (as suggested by Poulbere, column 4 lines 60-64) advantageously provides apparatus, and an associated method, by which to detect, at a receiving station, reception of a selected symbol sequence, such as a preamble portion of a frame of data.

In regards to claims 29 and 61 Maltsev teaches detecting standard SOP preamble as described in the rejections of claims 28 and 60 above.

Maltsev does not explicitly teach detecting by one of the set of SOP methods that comprises: detecting a rise in the average received signal power; detecting a rise in the average power rise of the received signal; detecting a rise in a measure of the quality of the correlation of the input signal with a known part of the preamble; and detecting a rise in a weighted sum of the measure of the average received signal power and the measure of the correlation of the input signal with the known part of the preamble.

Poulbere in the same field of endeavor teaches detecting by one of the set of SOP methods that comprises: detecting a rise in the average received signal power; detecting a rise in the average power rise of the received signal (column 9 claim 7, symbol set detector detects the selected symbol set to have been received at the communication device when both the indications of the phase values are greater than the selected phase-value threshold and the ratios of the values of the correlation calculations relative to values of the average power levels are greater than a selected ratio-value threshold).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maltsev's symbol detecting method with the method of detecting by one of the set of SOP methods that comprises: detecting a rise in the average received signal power; detecting a rise in the average power rise of the received signal as suggested by Poulbere. The motivation is that, such method (as suggested by Poulbere, column 4 lines 60-64) advantageously provides apparatus, and an associated method, by which to detect, at a receiving station, reception of a selected symbol sequence, such as a preamble portion of a frame of data.

In regards to claims 30, 51 and 63 Maltsev teaches a packet according each of the at least one wireless networking standard includes a preamble, wherein the SOP detector detects a packet by detecting whether any logical function corresponding to any of the at least one standard is true as described in the rejections of claim 28 above.

In regards to claims 30, 51 and 63 Maltsev does not explicitly teach each corresponding function being of at least one of the set of logical indicators for each

standard: that a threshold was exceeded by the average received signal power; that a threshold was exceeded by the average power rise of the received signal; and that a threshold was exceeded by a measure of the quality of the correlation of the input signal with a known part of the preamble. In regards to claim 31 Maltsev does not explicitly teach each corresponding function being of at least one of the set of logical indicators for each standard: that a threshold was exceeded by the average received signal power; that a threshold was exceeded by the average power rise of the received signal; that a threshold was exceeded by a measure of the quality of the correlation of the input signal with a known part of the preamble, and that a threshold was exceeded by a weighted sum of the measure of the average received signal power and the measure of the correlation of the input signal with the known part of the preamble.

Poulbere in the same field of endeavor teaches each corresponding function being of at least one of the set of logical indicators for each standard: that a threshold was exceeded by the average received signal power; that a threshold was exceeded by the average power rise of the received signal (column 9 claim 7, symbol set detector detects the selected symbol set to have been received at the communication device when both the indications of the phase values are greater than the selected phase-value threshold and the ratios of the values of the correlation calculations relative to values of the average power levels are greater than a selected ratio-value threshold).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maltsev's symbol detecting method with the method of each corresponding function being of at least one of the set of logical indicators for each

standard: that a threshold was exceeded by the average received signal power; that a threshold was exceeded by the average power rise of the received signal as suggested by Poulbere. The motivation is that, such method (as suggested by Poulbere, column 4 lines 60-64) advantageously provides apparatus, and an associated method, by which to detect, at a receiving station, reception of a selected symbol sequence, such as a preamble portion of a frame of data.

In regards to claims 32, 41 and 65 Maltsev teaches a packet according to the wireless networking standard includes a preamble that has a first part that includes a series of periodic symbols (paragraph 0023, short training symbols) and a second part (paragraph 0025, long training symbols) and an autocorrelation circuit to determine a measure of the autocorrelation of the input signal at the period of the symbols (paragraph, 0028, Short training symbol processing element 300 may include autocorrelating element 302 to preliminary detect an OFDM packet by correlating at least one of a plurality of short training symbols with a next of the short training symbols), that a threshold was exceeded by a measure of the correlation of the input signal with at least one of the short symbols (paragraph 0028, Short training symbol processing element 300 may include autocorrelating element 302 to preliminary detect an OFDM packet by correlating at least one of a plurality of short training symbols with a next of the short training symbols and generate initial packet detection signal 303 at time (t.sub.det)) and the time a measure the correlation of the input signal with at least one of the short symbols peaks to indicate an SOP time (paragraph 0028, Short training symbol processing element 300 may include autocorrelating element 302

to preliminary detect an OFDM packet by correlating at least one of a plurality of short training symbols with a next of the short training symbols and generate initial packet detection signal 303 at time (t.sub.det)).

Maltsev does not explicitly teach and processing circuit includes at least two of the set that comprises: a circuit to determine a measure of the carrier to noise ratio (CNR); a circuit to determine a measure of the rise in the received signal power; a symbol correlation circuit to determine a measure the correlation of the input signal with at least one of the short symbols; and a second correlation circuit to determine a measure of the correlation of the input signal with the start of the second part of the preamble, wherein the initial timing determining circuit determines the initial timing using at least two indicators of the set of indicators that comprises: whether or not a measure of the carrier to noise ratio (CNR) is within a CNR range; that a range was reached by a measure of the autocorrelation of the input signal at the period of the symbols; that a threshold was exceeded by a measure of the correlation of the input signal with at least one of the short symbols; and that a threshold was exceeded by a measure of the correlation of the input signal with the start of the second part of the preamble, and wherein the initial timing determining circuit determines the initial timing from at least one of: the time a measure of the received signal power exceeds a signal power threshold to indicate an SOP time; the time a measure of the autocorrelation of the input signal at the period of the symbols changes to indicate the time of end of the series of periodic symbols; and the time a measure of the correlation of the input signal with the

start of the second part of the preamble peaks to indicate the time of the start of the second part.

Poulbere in the same field of endeavor teaches a circuit (Figure 1, element 36) to determine a measure of the rise in the received signal power (columns 5-6 lines 65-15, the controller 32 is coupled, here represented by the line 34, to receive indications of symbol sequences, i.e., the receive signal, received by the receive circuitry 22. Such sequences are provided to a power level calculator 36 and to a correlation calculator 38. The power level calculator 36 is operable to compute a signal power, R(k) (i.e. received power signal) over L signal samples according to a equation), that a threshold was exceeded by a measure of the rise in the received signal power to indicate an SOP time (column 9 claim 7, symbol set detector detects the selected symbol set to have been received at the communication device when both the indications of the phase values are greater than the selected phase-value threshold and the ratios of the values of the correlation calculations relative to values of the average power levels are greater than a selected ratio-value threshold).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maltsev's symbol detecting method with a circuit to determine a measure of the rise in the received signal power, that a threshold was exceeded by a measure of the rise in the received signal power to indicate an SOP time as suggested by Poulbere. The motivation is that, such method (as suggested by Poulbere, column 4 lines 60-64) advantageously provides apparatus, and an associated

method, by which to detect, at a receiving station, reception of a selected symbol sequence, such as a preamble portion of a frame of data.

In regards to claims 35, 43, 47 and 66 Maltsev teaches the wireless networking standard is one of the IEEE 801.11 OFDM standards according to which the first part of the preamble includes a periodic series of short symbols and the second part includes long symbols and a guard interval (section 0018 and 0036, OFDM packets may be preceded by a sequence of training symbols, which may be used for packet detection and synchronization. The sequence may include a plurality of short training symbols followed by a plurality of long training symbols. In one embodiment, the sequence of training symbols may be in accordance with an IEEE 802.11a standard and may have as set of known characteristics).

5. Claims 9 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maltsev and Poulbere as applied to claims 1 and 44 above and further in view of Chadha et al. (US PAT PUB 2004/0170237, hereinafter Chadha).

In regards to claims 9 and 54 Maltsev teaches detecting standard SOP preamble as described in the rejections of claims 1 and 44 above.

Maltsev and Poulbere do not explicitly teach the measure of the correlation quality is a measure of the correlation power normalized by the power of the received signal.

Chadha in the same field of endeavor teaches the measure of the correlation quality is a measure of the correlation power normalized by the power of the received

signal (paragraph 0045, the auto-correlation output values are normalized with the energy of the signal from the short power detector to produce a correlation plateau).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maltsev and Poulbere's symbol detecting method with the method of measuring of the correlation quality being measure of the correlation power normalized by the power of the received signal as suggested by Chadha. The motivation is that (as suggested by Chadha, paragraph 0046) the measurement and duration of the auto correlation plateau is an important indicator of the extent of the short preamble and enables a receiver to efficiently use the indicator to further reliably calculate other synchronization parameters in the system.

6. Claims 46, 50, 55, 56 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maltsev and Poulbere as applied to claim 44 above and further in view of Chadha et al. (US PAT PUB 2004/0170237, hereinafter Chadha).

In regards to claims 46 and 55 Maltsev and Poulbere teach detecting standard SOP preamble as described in the rejections of claim 44 above.

In regards to claims 46 and 55 Maltsev and Poulbere do not explicitly teach detecting that a threshold was exceeded by a measure of the quality of the correlation of the input signal with a known part of the preamble.

Chadha in the same field of endeavor teaches detecting that a threshold was exceeded by a measure of the quality of the correlation of the input signal with a known part of the preamble (paragraph 45-47).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maltsev and Poulbere's symbol detecting method with the method of detecting that a threshold was exceeded by a measure of the quality of the correlation of the input signal with a known part of the preamble as suggested by Chadha. The motivation is that (as suggested by Chadha, paragraph 0046) the measurement, duration (threshold) of the auto correlation plateau is an important indicator of the extent of the short preamble and enables a receiver to efficiently use the indicator to further reliably calculate other synchronization parameters in the system.

In regards to claim 50, Maltsev and Poulbere do not explicitly teach the measure of the correlation quality is a measure of the correlation power normalized by the power of the received signal.

Chadha in the same field of endeavor teaches the measure of the correlation quality is a measure of the correlation power normalized by the power of the received signal (paragraph 0045, the auto-correlation output values are normalized with the energy of the signal from the short power detector to produce a correlation plateau).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maltsev and Poulbere's symbol detecting method with the method of measuring of the correlation quality being measure of the correlation power normalized by the power of the received signal as suggested by Chadha. The motivation is that (as suggested by Chadha, paragraph 0046) the measurement and duration of the auto correlation plateau is an important indicator of the extent of the

short preamble and enables a receiver to efficiently use the indicator to further reliably calculate other synchronization parameters in the system.

In regards to claim 56, Maltsev does not explicitly teach computing the ratio of the received power during the presence of a packet and the received signal power before the packet arrived.

Poulbere in the same field of endeavor teaches computing the ratio of the received power during the presence of a packet and the received signal power a relatively small time before the packet arrived (column 6 lines 55-67).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maltsev and Poulbere's symbol detecting method with the method of computing the ratio of the received power during the presence of a packet and the received signal power a relatively small time before the packet arrived as suggested by Poulbere. The motivation is that (as suggested by Poulbere, column 7 lines 1-3) such ratio reliably and efficiently helps in positive identification of the indication that detection of the selected symbol sequence has occurred.

In regards to claim 59 Maltsev teaches the wireless networking standard is one of the IEEE 801.11 OFDM standards according to which the first part of the preamble includes a periodic series of short symbols and the second part includes long symbols and a guard interval (section 0018 and 0036, OFDM packets may be preceded by a sequence of training symbols, which may be used for packet detection and synchronization. The sequence may include a plurality of short training

symbols followed by a plurality of long training symbols. In one embodiment, the sequence of training symbols may be in accordance with an IEEE 802.11a standard and may have as set of known characteristics).

7. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maltsev and Poulbere as applied to claim 44 above and further in view of Alexander et al. (US PAT 2004/0264561, hereinafter Alexander).

In regards to claim 48 Maltsev and Poulbere teach detecting standard SOP preamble as described in the rejections of claim 44 above.

Maltsev and Poulbere do not explicitly teach detecting a rise in a weighted sum of the measure of the average received signal power and the measure of the correlation of the input signal with the known part of the preamble.

Alexander in the same field of endeavor teaches detecting a rise in a weighted sum of the measure of the average received signal power and the measure of the correlation of the input signal with the known part of the preamble (paragraph 0011).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maltsev and Poulbere's symbol detecting method with the method of detecting a rise in a weighted sum of the measure of the average received signal power and the measure of the correlation of the input signal with the known part of the preamble as suggested by Alexander. The motivation is that the time detection of preamble using such method is an important indicator of the extent of the received

preamble and enables a receiver to efficiently use the indicator to further reliably calculate other synchronization parameters in the OFDM system.

8. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maltsev, Poulbere and Chadha as applied to claims 44 and 46 above and further in view of Imamura (US PAT 2003/0012297).

In regards to claim 49 Maltsev teaches detecting standard SOP preamble as described in the rejections of claim 44 above.

Maltsev, Poulbere and Chadha do not explicitly teach performing comparison measure of the instantaneous correlation power with the average correlation power in the recent past.

Imamura in the same field of endeavor teaches performing comparison measure of the instantaneous correlation power with the average correlation power in the recent past (paragraph 0167).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maltsev's symbol detecting method with the method of performing comparison measure of the instantaneous correlation power with the average correlation power in the recent past as suggested by Imamura. The motivation is that the comparison measurement of the instantaneous correlation power with the average correlation power in the recent past is an important step that enables a receiver to efficiently use the result and further reliably calculate other synchronization parameters in the OFDM system.

9. Claims 7 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maltsev and Poulbere as applied to claims 1 and 44 above and further in view of Marsili (US PAT PUB 2005/0220212).

In regards to claim 7, Maltsev teaches *a method/means comprising: method/means for wirelessly receiving a signal* (paragraph 0015, The present invention pertains to wireless communications, and in one embodiment, the present invention pertains to detection and synchronization with a symbol boundary of an orthogonal frequency division multiplexed (OFDM) symbol); *method/means for detecting a start of packet (SOP) from the received signal* (paragraph 0018, WCDs detect OFDM packets and synchronize to OFDM symbol boundaries (i.e. SOP)) *using at least one SOP detection criterion for a packet that conforms to a wireless networking standard* (section 0018, OFDM packets may be preceded by a sequence of training symbols, which may be used for packet detection and synchronization. The sequence may include a plurality of short training symbols followed by a plurality of long training symbols. In one embodiment, the sequence of training symbols may be in accordance with an IEEE 802.11a standard and may have as set of known characteristics. In another embodiment, the sequence of training symbols may be in accordance with a HiperLAN standard and may have other sets of known characteristics); *method/means for determining a plurality of metrics (*coarse timing signal, fine timing signal) *from the received signal, and in the case an SOP is detected, using at least two of the plurality of metrics to determine an initial timing for a received packet* (paragraph 0023, In response to initial packet detection, short training symbol processing element 232 may also utilize

at least some of the short training symbols to generate coarse timing signal 236 at time (t.sub.cs) which may indicate an end of the short training symbols and beginning of the long training symbols and data symbols. Synchronization unit 204 may also include long training symbol processing element 234 which may utilize at least some of the long training symbols received from RF receive unit 202 to perform a fine timing synchronization operation to generate fine timing signal 238 at time (t.sub.fs) in response to coarse timing signal 236).

Maltsev does not explicitly teach determining a corresponding logical function of at least one/two of the set of logical indicators including: that a threshold was exceeded by the average received signal power; that a threshold was exceeded by the average power rise of the received signal; that a threshold was exceeded by a measure of the quality of the correlation of the input signal with a known part of the preamble; and that a threshold was exceeded by a weighted sum of the measure of the average received signal power and the measure of the correlation of the input signal with the known part of the preamble,

Poulbere in the same field of endeavor teaches determining a corresponding logical function of at least one/two of the set of logical indicators including: that a threshold was exceeded by the average received signal power; that a threshold was exceeded by the average power rise of the received signal (column 9 claim 7, symbol set detector detects the selected symbol set to have been received at the communication device when both the indications of the phase values are greater than the selected phase-value threshold and the ratios of the values of the correlation

calculations relative to values of the average power levels are greater than a selected ratio-value threshold).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maltsev's symbol determining method with a method of corresponding logical function of at least two of the set of logical indicators including: that a threshold was exceeded by the average received signal power; that a threshold was exceeded by the average power rise of the received signal as suggested by Poulbere. The motivation is that, such method (as suggested by Poulbere, column 4 lines 60-64) advantageously provides apparatus, and an associated method, by which to detect, at a receiving station, reception of a selected symbol sequence, such as a preamble portion of a frame of data.

Maltsev and Poulbere do not explicitly teach determining the OR of plurality of logical indicators.

Marsili in the same field of endeavor teaches determining the OR of plurality of logical indicators (paragraphs 0060-0063).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maltsev's symbol determining method and a method of corresponding logical function of at least two of the set of logical indicators including: that a threshold was exceeded by the average received signal power; that a threshold was exceeded by the average power rise of the received signal as suggested by Poulbere with method of determining the OR of plurality of logical indicators as suggested by Marsili. The motivation is that (as suggested by Marsilli, paragraph 0061)

using such method a useful signal can be detected reliably and rapidly under the most varied conditions.

In regards to claim 52, Maltsev teaches detecting standard SOP preamble as described in the rejections of claim 44 above.

Maltsev does not explicitly teach determining a corresponding logical function of at least one/two of the set of logical indicators including: that a threshold was exceeded by the average received signal power; that a threshold was exceeded by the average power rise of the received signal; that a threshold was exceeded by a measure of the quality of the correlation of the input signal with a known part of the preamble; and that a threshold was exceeded by a weighted sum of the measure of the average received signal power and the measure of the correlation of the input signal with the known part of the preamble,

Poulbere in the same field of endeavor teaches determining a corresponding logical function of at least one/two of the set of logical indicators including: that a threshold was exceeded by the average received signal power; that a threshold was exceeded by the average power rise of the received signal (column 9 claim 7, symbol set detector detects the selected symbol set to have been received at the communication device when both the indications of the phase values are greater than the selected phase-value threshold and the ratios of the values of the correlation calculations relative to values of the average power levels are greater than a selected ratio-value threshold).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maltsev's symbol determining method with a method of corresponding logical function of at least two of the set of logical indicators including: that a threshold was exceeded by the average received signal power; that a threshold was exceeded by the average power rise of the received signal as suggested by Poulbere. The motivation is that, such method (as suggested by Poulbere, column 4 lines 60-64) advantageously provides apparatus, and an associated method, by which to detect, at a receiving station, reception of a selected symbol sequence, such as a preamble portion of a frame of data.

Maltsev and Poulbere do not explicitly teach determining the OR of plurality of logical indicators.

Marsili in the same field of endeavor teaches determining the OR of plurality of logical indicators (paragraphs 0060-0063).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Maltsev's symbol determining method and a method of corresponding logical function of at least two of the set of logical indicators including: that a threshold was exceeded by the average received signal power; that a threshold was exceeded by the average power rise of the received signal as suggested by Poulbere with method of determining the OR of plurality of logical indicators as suggested by Marsili. The motivation is that (as suggested by Marsilli, paragraph 0061) using such method a useful signal can be detected reliably and rapidly under the most varied conditions.

Allowable Subject Matter

10. Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. Claims 3-5, 10-27, 33, 34, 36-39, 42, 53, 57 and 58 are allowed.

Response to Arguments

1. Applicant's arguments, see page 36 of the Remarks section, filed 5/23/2008, with respect to the 35 USC 112 second paragraph rejection have been fully considered and are persuasive. The 35 USC 112 second paragraph rejection has been withdrawn.

2. Applicant's arguments see pages 36-41 of the Remarks section, filed 5/23/2008, with respect to the rejections of the claims have been fully considered. Applicant has amended the independent claims. Applicant's amendment necessitated a new ground of rejections presented in this office action. As such, any further response to Applicant's argument is moot.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SALMAN AHMED whose telephone number is (571)272-8307. The examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edan Orgad can be reached on (571) 272-7884. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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1/14/2008

/Edan Orgad/
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